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What is claimed is:

1. A method of treating substances comprising the steps of:

generating discharge plasma within an electrically insulating honeycomb structural body having a plurality of through holes by applying a discharge voltage across electrodes, at least a part of the electrodes being made of a metal having catalysis;

flowing a fluid containing substances to be treated through said plurality of through holes formed in the honeycomb structural body; and

treating the substances contained in the fluid by a reaction with the discharge plasma and by catalysis of at least a part of the electrodes.

2. A method of treating substances comprising the steps of:

generating discharge plasma within an electrically insulating honeycomb structural body having a plurality of through holes by applying a discharge voltage across electrodes, at least a part of said honeycomb structural body being made of a material having photocatalysis;

flowing a fluid containing substances to be treated through said plurality of through holes formed in the honeycomb structural body; and

treating the substances contained in the fluid by a reaction with the discharge plasma and by decomposition and/or oxidation by active oxygen generated by said photocatalysis material excited with radiation emitted from the discharge plasma.

3. A method of treating substances comprising the steps of:

generating discharge plasma within an electrically insulating honeycomb structural body having a plurality of through holes by applying a discharge voltage across electrodes, at least a part of said honeycomb structural body being made of a photocatalysis material and at least a part of the electrodes being made of a metal having catalysis;

flowing a fluid containing substances to be treated through said plurality

of through holes formed in the honeycomb structural body; and

treating the substances contained in the fluid by a reaction with the discharge plasma, by catalysis of at least a part of the electrodes and by active oxygen generated by said photocatalysis material excited with radiation emitted from the discharge plasma.

4. A method according to ~~one of claims 1-3~~ Claim 1, wherein said discharge plasma within the honeycomb structural body is of a pulse corona discharge plasma.

5. A method according to claim 5, wherein said pulse corona discharge plasma is generated within the honeycomb structural body such that electrons having sufficiently high energy for decomposing harmful substances such as dioxins are produced.

6. A method according to claim 5, wherein electrons having energy of 3-10 eV are generated by the pulse corona discharge plasma.

7. A method according to claim 6, wherein said pulse corona discharge plasma is generated by a pulse supply source producing a pulse current having a raising edge not less than $5\times10^{10}$, particularly $1\times10^{11}$, amperes per second.

8. A method according to claim 7, wherein a corona discharge pulse for generating the pulse corona discharge plasma is generated by said pulse supply source including a static induction thyristor as a switching element.

9. A method according to ~~any one of claims 1-3,~~ Claim 1 wherein said discharge plasma is generated within the honeycomb structural body in a direction parallel to a longitudinal direction of the through holes.

10. A method according to ~~any one of claims 1-3,~~ Claim 1 wherein said discharge plasma is generated within the honeycomb structural body in a direction perpendicular to a longitudinal direction of the through holes.

11. A method of treating substances comprising the steps of:

generating discharge plasma within a treating space at least a part of which is made of a material having photocatalysis;

flowing a fluid containing substances to be treated through said treating space; and

treating the substances contained in the fluid by a reaction with the discharge plasma and by decomposition and/or oxidation by active oxygen generated by the photocatalysis material excited with radiation emitted from the discharge plasma.

12. A method according to claim 11, wherein said discharge plasma generated within the treating space is of a pulse corona discharge plasma.

13. An apparatus for treating substances comprising:

an electrically insulating honeycomb structural body having a plurality of parallel through holes through which a fluid containing substances to be treated is flowed;

an electrode system for generating discharge plasma within the honeycomb structural body such that the substances contained in the fluid flowing through the through holes is reacted with the discharge plasma, at least a part of said electrode system being made of a material having catalysis; and

a power supply source connected to said electrode system for applying a discharge voltage to said electrode system such that the discharge plasma is generated within the through holes of the honeycomb structural body.

14. An apparatus for treating substances comprising:

a honeycomb structural body having a plurality of parallel through holes through which a fluid containing substances to be treated is flowed, at least a part of said honeycomb structural body being made of ceramics including a material having photocatalysis;

an electrode system for generating discharge plasma within the

honeycomb structural body such that the substances contained in the fluid flowing through the through holes are reacted with the discharge plasma and said material having photocatalysis is excited with radiation emitted from the discharge plasma; and

a voltage supply source connected to said electrode system for applying a discharge voltage to said electrode system such that the discharge plasma is generated within the through holes of the honeycomb structural body.

15. An apparatus for treating substances comprising:

an electrically insulating honeycomb structural body having a plurality of parallel through holes through which a fluid containing substances to be treated is flowed, at least a part of said honeycomb structural body being made of a material having photocatalysis;

an electrode system for generating discharge plasma within the honeycomb structural body such that the substances contained in the fluid flowing through the through holes is reacted with the discharge plasma and said material having photocatalysis is excited with radiation emitted from the discharge plasma, at least a part of said electrode system being made of a material having catalysis; and

a power supply source connected to said electrode system for applying a discharge voltage to said electrode system such that the discharge plasma is generated within the through holes of the honeycomb structural body.

16. An apparatus according to ~~any one of claims 13-15~~ claim 13, wherein said power supply source is formed by a pulse supply source for generating pulse corona discharge plasma within the honeycomb structural body.

17. An apparatus according to claim 16, wherein said pulse supply source generates a pulse discharge voltage having such pulse duration and amplitude that electrons having sufficiently high energy for decomposing harmful substances such as dioxins.

18. An apparatus according to claim 17, wherein said pulse supply source is constructed such that electrons having energy of 3-10 eV are generated by the pulse corona discharge plasma.

19. An apparatus according to claim 18, wherein said pulse supply source is constructed such that a raising edge of a discharge current is steeper than $5\times10^{10}$ amperes/sec, particularly $1\times10^{11}$ amperes/sec.

20. An apparatus according to claim 19, wherein said pulse supply source includes a static induction thyristor as a switching element.

21. An apparatus according to ~~any one of claims 13-15~~ claim 13, wherein said power supply source is formed by a AC power supply source.

22. An apparatus according to claim 21, wherein said AC power supply source has a peak voltage of 70 kV.

23. An apparatus according to ~~any one of claims 13-15~~ claim 13, wherein said electrode system comprises first and second electrodes provided on respective end surfaces of the honeycomb structural body and said first and second electrodes are connected to said power supply source such that a discharge voltage is applied in a direction parallel to a longitudinal direction of the through holes.

24. An apparatus according to claim 23, wherein said first and second electrodes are formed by first and second mesh electrodes provided on the end surfaces of the honeycomb structural body.

25. An apparatus according to claim 23, wherein said first and second electrodes are formed by metal films applied on the end surfaces of the honeycomb structural body.

26. An apparatus according to claim 25, wherein said metal films are extended onto inner walls of the through holes.

27. An apparatus according to ~~any one of claims 13-15~~ claim 13, wherein said electrode system comprises a cylindrical electrode arrange on the honeycomb

structural body and a plurality of wire electrodes passing through holes, said cylindrical electrode being connected to a first output terminal of the power supply source and said plurality of wire electrodes being connected to a second output terminal of the power supply source.

28. An apparatus according to ~~any one of claims 13-15~~ claim 13, wherein said electrode system comprises first and second groups of a plurality of wire electrodes passing through the through holes, said first and second groups of a plurality of wire electrodes being connected to first and second output terminals, respectively of the power supply source.

29. An apparatus according to ~~any one of claims 13-15~~ claim 13, wherein said electrode systems comprises a first group of a plurality of strip electrodes each being applied on inner walls of the through holes and a second group of a plurality of strip electrodes each being applied on the inner walls of the through holes to be opposed to the first group strip electrodes, said first and second groups of a plurality of wire electrodes being connected to first and second output terminals, respectively of the power supply source.

30. An apparatus according to ~~any one of claims 13-15~~ claim 13, wherein inner walls of the through holes of the honeycomb structural body have protrusions and depressions formed therein.

31. An apparatus according to ~~any one of claims 13-15~~ claim 13, wherein a plurality of honeycomb structural bodies are arranged in parallel with each other.

32. An apparatus according to ~~any one of claims 13-15~~ claim 13, wherein a plurality of honeycomb structural bodies are arranged in series with each other.

33. An apparatus according to claim 32, wherein different discharge voltages are applied across respective honeycomb structural bodies.

34. An apparatus according to ~~any one of claims 13 and 15~~ claim 13, wherein said material having catalysis is a metal selected from the group consisting of

platinum, palladium and nickel series metal.

35. An apparatus according to ~~any one of claims 14 and 15,~~ claim 14 wherein said honeycomb structural body is made of ceramics including a material having photocatalysis.

36. An apparatus according to claim 35, wherein said material having photocatalysis is $TiO_2$.

37. An apparatus for treating substances comprising:

a sleeve electrode;

a first insulating sleeve made of ceramics containing a material having photocatalysis and arranged in an inner wall of the sleeve electrode, said first insulating sleeve constituting a passage for a fluid containing substances to be treated;

a wire electrode arrange along a central axis of the first insulating sleeve;

a second insulating sleeve made of ceramics containing a material having photocatalysis and arranged around the wire electrode; and

a discharge voltage source connected to said sleeve electrode and wire electrode to generate discharge plasma between the sleeve electrode and the wire electrode;

wherein the substances contained in the fluid are treated by reaction with the discharge plasma and with active oxygen generated by exciting the material having photocatalysis with radiation emitted from the discharge plasma.

38. An apparatus according to claim 37, wherein said discharge voltage source is formed by a pulse supply source to generate pulse corona discharge between the sleeve electrode and the wire electrode.

39. An apparatus according to claim 37, wherein the material having photocatalysis is $TiO_2$.